



AM/FM STEREO RECEIVER

DA-R7

INSTRUCTION BOOK

Congratulations on your choice of the Mitsubishi AM FM Stereo Receiver Model DA-R7. For best performance results, please read this instruction book carefully before use.

WARNING—TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

For future reference a space has been provided below for recording the serial number of your receiver.

Serial #

PRECAUTIONS

1. GENERAL

CONNECT ONLY TO YOUR A.C. POWER SUPPLY
The A.C. power supply required by this unit is marked on the rear panel. Connection to any other power source may damage this unit and cause severe electrical shock.

DO NOT PLUG IN OR UNPLUG THE POWER CORD WITH WET HANDS

There is great danger of severe electrical shock if the power cord is plugged in or unplugged with wet hands. Do not attempt to unplug the cord from an A.C. outlet by pulling the cord. Always grasp the plug itself firmly to remove it from the A.C. outlet.

HANDLE THE POWER CORD WITH CARE

Do not bend sharply or twist the power cord, nor allow it to become trapped under heavy furniture. If the insulation becomes damaged, the conductor breaks, or poor contacts occur, request service from your authorized service center. Continued use under these conditions may cause fire or electrical shock.

DO NOT ALLOW WATER OR ANY FOREIGN MATTER TO GET INSIDE THIS UNIT

Should water or a metallic object accidentally fall into this unit, immediately unplug the power cord and consult your authorized service center.

DO NOT TOUCH THE INSIDE OF THIS UNIT

There are high voltages inside this unit. Never remove the bottom cover or the wooden case. All inspection and repairs, including fuse replacement, should be carried out only by your authorized service center.

UNPLUG THE POWER CORD AT THE FIRST SIGN OF TROUBLE

At the first sign of unusual noise, odor or malfunction, unplug the power cord and consult your authorized service center. Continued use under these conditions may increase damage or cause additional problems.

2. LOCATION
AVOID PLACEMENT IN DIRECT SUNLIGHT, NEAR AIR CONDITIONER, ETC.

This unit can be adversely affected by operation at unusually high or low temperatures. Place in a well ventilated area for proper heat dissipation. Avoid placement in direct sunlight, near air conditioners, in poorly ventilated areas or in areas of excess humidity or dust. Do not block the ventilation holes.

3. CONNECTIONS
BE SURE TO TURN THE POWER OFF WHILE MAKING CONNECTIONS TO OTHER COMPONENTS

This is to prevent damage to the speakers from the 'popping' noise that would occur when plugging and unplugging connections to other components with the power on.

BE VERY CAREFUL TO MAKE THE CORRECT CONNECTIONS

If you reverse the R (right) and L (left) leads, you will reverse the stereo location of R and L channels.

BE VERY CAREFUL TO MAKE SECURE CONNECTIONS

Improperly connected plugs may become loose or disconnected, resulting in hum and other noise. If not corrected, deterioration of sound quality and damage to the speakers may result.

USE ONLY SHIELDED CORDS FOR THE LEADS
Use only shielded cords for interconnecting components. Do not use cords longer than 2m (about 6'). Excessive cord lengths can degrade high frequency response and may pick up interference that will produce hum or noise.

IF YOU CONNECT TWO PAIRS OF SPEAKERS, BOTH PAIRS SHOULD BE OPERATED AT THE SAME TIME ONLY IF THEIR COMBINED IMPEDANCE IS 4 OHMS OR MORE
If the combined impedance is less than 4 ohms, the protection circuit may operate and mute the power-output stage. The combined impedance can be calculated as shown below:

$$\text{COMBINED IMPEDANCE} = \frac{A \times B}{A + B} \text{ (OHMS)}, \text{ where}$$

A: Nominal impedance of the A speakers.

B: Nominal impedance of the B speakers.

So, for 8-ohm speakers, the combined impedance would be $(8 \times 8)/(8 + 8)$ or 4 ohms, which is a satisfactory value. If in doubt, please consult your audio dealer for additional information.

FRONT PANEL TERMINOLOGY AND FUNCTIONS

4. OPERATION

ALWAYS TURN THE VOLUME (ATTENUATOR) CONTROL FULL COUNTERCLOCKWISE BEFORE OPERATING ANY SWITCH, INCLUDING THE POWER ON/OFF SWITCH

This is to protect the speakers from the damage that can occur if the volume level is excessively high when switches are operated.

THERE WILL BE NO SOUND FOR A FEW SECONDS AFTER YOU TURN ON THE POWER. THIS IS NOT A MALFUNCTION.

This unit is equipped with a power output muting circuit which prevents 'popping' noise when the power switch is turned on or off.

5. CARE

Wipe the cabinet with a soft cloth when it becomes dusty. If it should get really dirty, dampen a soft cloth in a weak solution of mild soap and water, wring it out dry and wipe off. When finished, dry completely with a soft, dry cloth. Volatile materials such as alcohol, thinner, benzene, insecticides, etc., may remove the paint or affect the luster; they should not be applied to the unit.

1. POWER (Power Switch)

This switch turns the unit on and off. When in the ON position, the SIGNAL and TUNING meters and the dial scale are illuminated.

2. MODE (Mode Switch)

This switch selects whether reproduction will be stereo or monaural.

STEREO The normal play position. Sounds from the left channel of the source are reproduced through the left speaker, and sounds from the right channel through the right speaker.

MONO

Program material from both right and left channels is combined and reproduced through both speakers. Note that FM stereo broadcasts will be reproduced monaurally even though the FM STEREO indicator will remain illuminated.

3. LOUDNESS (Loudness Switch)

This switch introduces a special low and high frequency emphasis at low listening levels. This is done because the human ear is less sensitive to these frequencies at low listening levels. Select the position according to your personal preference.

4. RECORD SELECTOR (Selection Switch for Recording)

This switch selects which program can be recorded by the tape decks connected to the TAPE 1 and TAPE 2 terminals. It can also be used when duplicating from one tape deck to the other. Recording and duplicating are performed independently of the program selected for audition by the PROGRAM SELECTOR switch.

DUPLICATE This position is used to duplicate from the tape deck connected to the PLAY 1 inputs to the tape deck connected to the REC 2 outputs.

DUPLICATE This position is used to duplicate from the tape deck connected to the PLAY 2 inputs to the tape deck connected to the REC 1 outputs.

5. PROGRAM SELECTOR (Program Audition Selection Switch)

This switch selects the desired program source for audition. It operates independently of the source selected for recording, but can be used for monitoring.

TAPE 2

This position is used to playback or monitor the recording of a tape deck connected to the PLAY 2 inputs.

TAPE 1

This position is used to playback or monitor the recording of a tape deck connected to the PLAY 1 inputs.

TUNER

This position is for listening to programs on the AM/FM tuner section.

PHONO

This position is for listening to a turntable unit with moving magnet phonoc cartridge connected to the PHONO inputs.

AUX

This position is for listening to a second tuner, a turntable with a high output ceramic cartridge, an 8-track tape cartridge player, television audio, or any suitable high output sources connected to the AUX inputs.

6. SIGNAL (Signal Strength Meter)

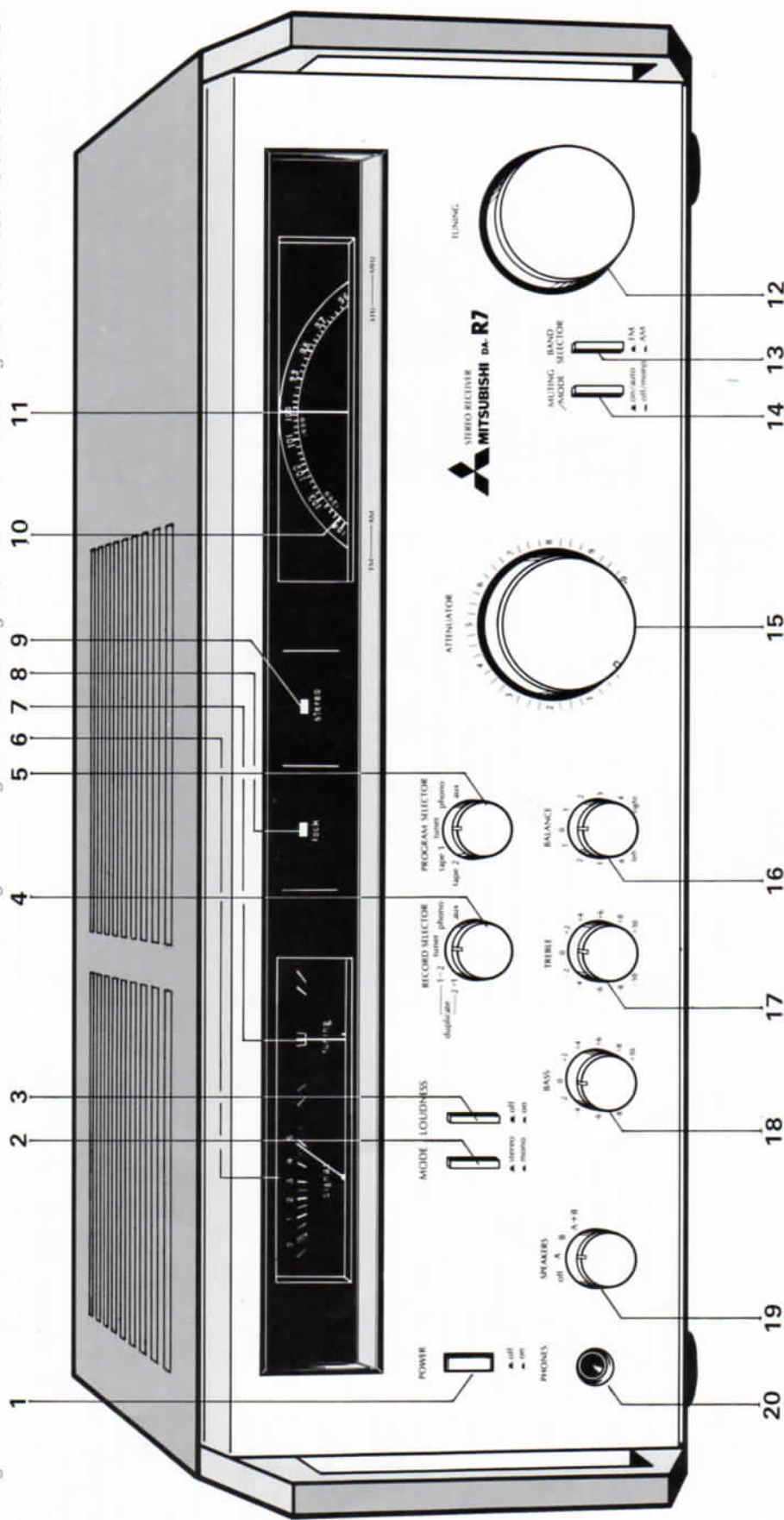
This meter shows the signal strength level of AM and FM broadcasts. For AM broadcasts, the best reception of a station is obtained when the needle of this meter reaches its maximum deflection to the right. This is also true for FM broadcasts, but a

more accurate indication is given by the TUNING meter.

7. TUNING (FM Center Channel Tuning Meter)

This meter shows the most distortion-free position for receiving the FM signal. When tuning in an FM

broadcast, first tune in the station with the SIGNAL meter, then use the TUNING meter for fine adjustments. When no FM signal is being received, the needle of this meter will be in the center. As a station is tuned in, the needle will move either to the left or right and then back to the center when



the best reception conditions have been obtained. This meter does not function for AM stations.

8. LOCK (Lock Tuning Indicator)

This indicator is illuminated when an FM broadcast is being received and tuned in to the center of the TUNING meter. This indicator does not work for AM reception.

9. STEREO (Stereo Indicator)

This indicator is illuminated when an FM stereo broadcast is being received in the stereo mode. If the MUTING/MODE switch is in the OFF/MONO position, this indicator will not light.

NOTE: The FM stereo program will not be heard in stereo unless the separate MODE switch is also in the STEREO position.

10. DIAL SCALE

This scale indicates FM and AM frequencies.

11. DIAL MARKER

This marker indicates the FM or AM frequency being received.

12. TUNING (Tuning Control)

This control is for selecting the desired station on AM or FM bands. Tune in the desired station by observing the position of the SIGNAL and TUNING meters while rotating this control.

13. BAND SELECTOR (Band Selection Switch)


This switch is for selecting FM or AM band reception.


FM  For receiving FM broadcasts

AM  For receiving AM broadcasts

14. MUTING/MODE (Muting Mode Selection Switch)

This switch is for selecting the mode of FM reception required.

ON/AUTO  For FM stereo broadcast reception. In this position both interstation noise and stations too weak for good stereo reception are muted while tuning.

OFF/MONO  For receiving FM broadcasts (including stereo broadcasts) monaurally. Muting is off, and both the interstation noise and the weaker stations will be heard.

15. ATTENUATOR (Volume Control)

This control adjusts the sound volume from the speakers and the headphones. The volume is increased by rotating clockwise, and decreased by rotating counterclockwise.

16. BALANCE (Balance Control)

This control adjusts the balance between the two channels. There is a click-stop at the central (zero) position. Rotate clockwise to move the sound image to the right, and counterclockwise to move it to the left. Adjust the control to match any imbalance between the channels of the program sources, or to compensate for listening positions that are nearer one speaker than the other.

17. TREBLE (Treble Tone Control)

This control boosts or reduces the level of the response in the high frequency region. The zero position is off or flat; rotate it clockwise to increase the treble and counterclockwise to reduce the treble. The best setting will depend upon the characteristics of your speakers, your listening room, and your personal preferences.

18. BASS (Bass Tone Control)

This control boosts or reduces the level of the response in the low frequency region. The zero position is off or flat; rotate it clockwise to increase the bass and counterclockwise to reduce it. The best setting will depend upon the characteristics of your speakers, your listening room and your personal preferences.

19. SPEAKERS (Speaker Selection Switches)

These switches control speaker selection.

OFF For listening with headphones. The speakers are disconnected.

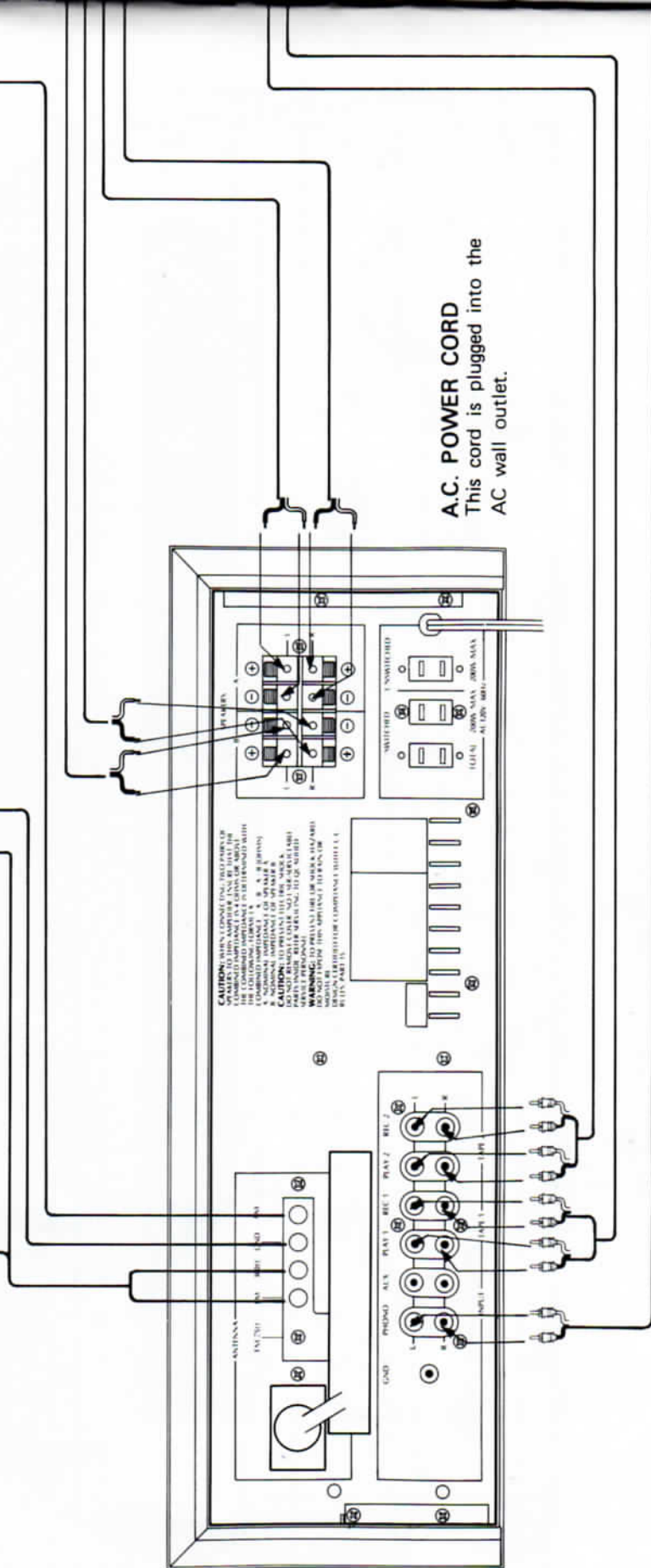
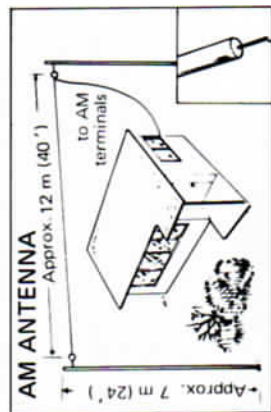
A For listening to the speakers connected to terminals A.

B For listening to the speakers connected to terminals B.

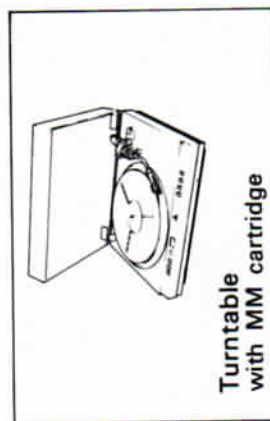
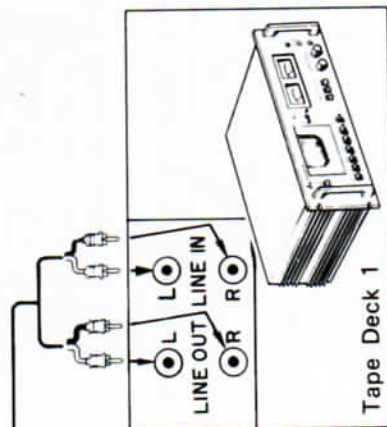
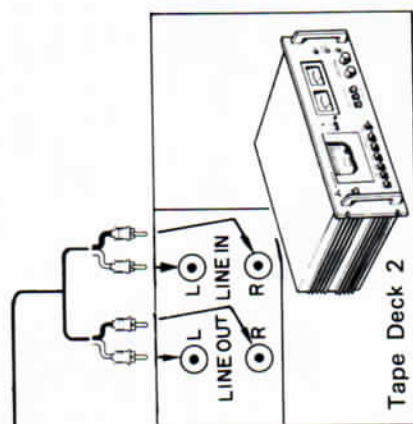
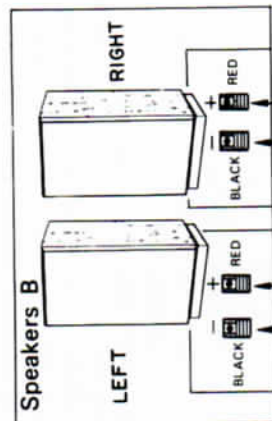
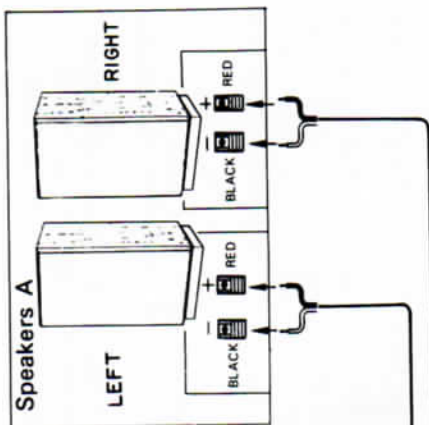
A + B For listening to the speakers connected to terminals A and B.

20. PHONES (Headphone Output)

For stereo listening with headphones, plug the headphones into this output socket. Listening with headphones is possible at all positions of the SPEAKERS switches.



A.C. POWER CORD
This cord is plugged into the AC wall outlet.



REAR PANEL TERMINOLOGY AND CONNECTIONS

GND (Ground Terminal)

Turntable units are generally provided with a ground wire. This should be connected to the GND terminal to reduce the risk of hum and noise.

PHONO (Phono Inputs)

The output leads from a turntable unit should be plugged in here.

AUX (Auxiliary Inputs)

These inputs may be used for any suitable high output source, including TV audio signal or 8-track tape cartridge players, etc.

PLAY 1, PLAY 2 (Tape Playback Inputs)

These inputs are for tape playback. Connect the tape deck outputs here.

REC 1, REC 2 (Tape Recording Outputs)

These outputs are for use when recording on tape. Connect the tape deck inputs here.

AM BAR ANTENNA

This is the antenna for receiving AM broadcasts. It is directional and is mounted on a ball joint. It should be pointed in the direction that gives best reception.

ANTENNA (Antenna Terminals)

These terminals are used for connecting FM and AM antennas. For more details see pages 11 and 12.

FM 75Ω (75-ohm Antenna Terminals with Holder)

For connecting 75-ohm coaxial cable.

FM 300Ω (FM 300-ohm Antenna Terminals)

For connecting 300-ohm flat twin lead.

GND (Ground Terminal)

For connecting a ground wire when using an outdoor AM antenna. A good ground connection can be obtained by burying a copper plate or rod and connecting the ground wire to it.

CAUTION: Never connect the ground wire to a water or gas pipe.

(AM External Antenna Terminal)

For connecting an external AM antenna. Only required in an area of poor AM reception.

AM

SPEAKERS (Speaker Connection Terminals)

These terminals are spring loaded for quick and effective connection. First cut back the outer insulation of the speaker leads for about 12mm (1/2") and twist each of the inner conductors. Depress a spring-loaded red or black grip and insert the twisted end of one of the speaker leads fully into the terminal hole. Release the grip, and the lead will be gripped firmly (pull gently on the lead to confirm this). Be careful to connect the (+) terminal on the speaker with the (+) terminal on the back panel of the unit.

If you only connect one pair of speakers, it is suggested that you connect them to the 'A' terminals.

SWITCHED/UNSWITCHED (Power-Supply Outlets)

Up to three other components can be plugged into the back panel of the unit, rather than having to be plugged into separate A.C. outlets. Two of them can be switched on by the POWER switch on the unit: use the SWITCHED outlets. The combined power consumption of these two units must not exceed 200W. Cassette tape decks, etc., are suitable. One component can be plugged into the UNSWITCHED outlet: a turntable unit is suitable. The power consumption from the unswitched outlet must not exceed 200W. Total power consumption when all three outlets are used must not exceed 400W.

INFORMATION ON ANTENNA

1. FM ANTENNA

For the best possible reception of FM broadcasts, a proper FM antenna is essential.

CHOOSE THE CORRECT ANTENNA FOR YOUR AREA

- **AREA WITH LOCAL STATIONS AND HIGH SIGNAL STRENGTHS**

The use of an outdoor FM antenna is recommended, but the T-shaped antenna provided with this unit can also be used. Connect it to the FM 300Ω terminals. The strength of the signal will change with the direction of the horizontal part of the antenna. Tune in an FM station and observe the signal strength meter. Orientate the antenna in the direction that brings the strongest and best reception.

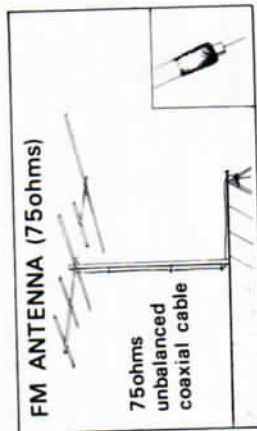
- **AREA WITH WEAK SIGNALS OR WHERE LARGE BUILDINGS BLOCK THE SIGNALS**

Use an outdoor FM antenna with from 3 to 8 elements located as high as conveniently possible. Usually 300-ohm flat twin lead is used between the antenna and the tuner. It should be connected to the FM 300Ω terminals.

- **AREA WITH INTERFERENCE OR NOISE**

In cities with heavy automobile traffic, near industrial plants, or near high voltage lines, you may encounter noisy interference even with an outdoor FM antenna. In this case you should replace the 300-ohm flat twin lead with 75-ohm coaxial cable. Some antennas have terminals for connecting 75-ohm coaxial cable, but in other cases an adapter (matching transformer) must be fitted at the

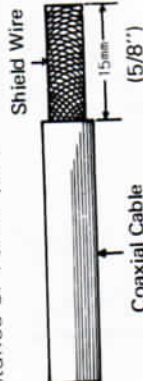
antenna. Connect the coaxial cable to the FM 75Ω terminals



HOW TO ATTACH COAXIAL CABLE

Use a coaxial cable cutter or some other suitable instrument such as a wire cutter, etc.

- 1 Cut back the outer insulation of the cable to a distance of 15mm (5/8").



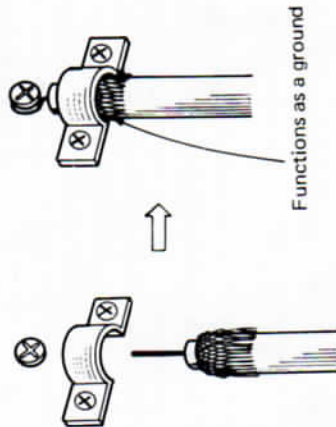
- 2 Peel the braided shield wire back over the outer insulation of the cable, exposing the inner insulation.



- 3 Cut the insulation from the inner conductor to a distance of 10mm (3/8").



- 4 Insert the end of the coaxial cable into the holder of the FM 75Ω terminals and fasten the inner conductor down. Then tighten the holder over the braided portion of the cable.



Functions as a ground

HOW TO POSITION THE FM ANTENNA

- Sometimes antenna locations in the "shadow" of a neighboring building cannot be avoided, but here the directional properties of FM antennae can be useful. Try rotating the antenna to get the strongest possible signal from the weakest FM station that you will want to listen to regularly. The SIGNAL meter is a good guide if you can get an assistant to watch it while altering the angle of the antenna.
- You can minimize automobile ignition noise by mounting the antenna as far away from the road as possible—either in height or on the other side of your house or apartment. Sometimes you can get an improvement by turning the "back" or non-sensitive side of the antenna towards the road.

- A remote-control motor-driven rotating FM antenna may be the only solution if you cannot obtain satisfactory reception with a fixed antenna.

ATTENUATION

If you live very close to one or more powerful FM transmitters, their strong signals may cause interference with other stations and the programs may sound distorted. Your authorized audio dealer can advise you whether an attenuator is necessary. (This unit is particularly resistant to this form of distortion.)

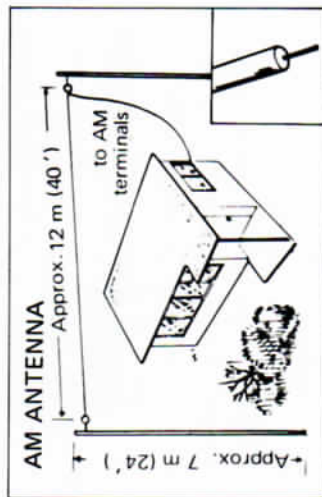
2. AM ANTENNA

FERRITE BAR ANTENNA

This built-in bar AM antenna on the back of the unit is highly sensitive and no outdoor antenna should normally be necessary. Fold the bar antenna out, away from the back panel, and orient it for the best reception. Be careful not to place the A.C. power cord or other wires too close to the bar antenna, since this may cause interference.

EXTERNAL ANTENNA

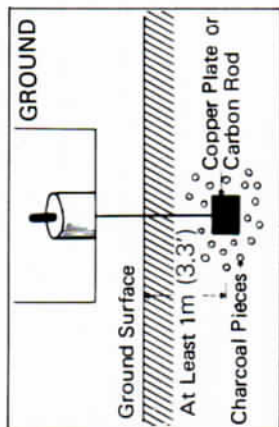
If you wish to listen to weak or very remote AM stations, connect an external antenna. The recommended antenna is 7 m (24') high and 12 m (40') long).



3. GROUND

You can receive broadcasts without a ground wire. However, we recommend the use of a good ground wire for the reduction of noisy interference and for safer operation.

CAUTION: Never connect the ground wire to a gas or water pipe.



OPERATIONS

BEFORE SWITCHING ON

Check the following items before pushing the POWER switch to the ON position.

- All components are properly connected.
- The SPEAKERS switches (A, B or A + B) for the speakers you have connected are in the ON position.
- The ATTENUATOR control is turned fully counterclockwise (to minimum volume, the zero position).
- All other controls are turned to the "top or 12 o'clock" position.

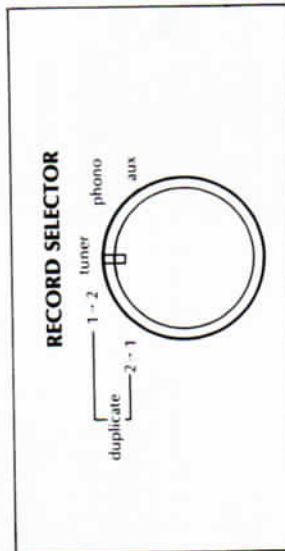
Only now should you depress the POWER switch to the ON position.

NOTE 1: Failure to turn the ATTENUATOR fully down can severely damage the speakers when the POWER switch is pushed to the ON position.

NOTE 2: If your speakers have a maximum input rating less than the rated power output of this unit, they can be severely damaged by listening at excessively high levels. Turn the volume down immediately you detect any sense of strain or distortion in the sound from the speakers, and avoid using such high levels again. This applies to all program sources.

1. LISTENING TO BROADCASTS

- 1 The PROGRAM SELECTOR should be in the TUNER position.



- 2 For FM reception, the BAND SELECTOR should be in the FM position, the MUTING/MODE switch in the ON/AUTO (▲) position, until other settings prove desirable.

For AM reception, the BAND SELECTOR should be in the AM position.

- 3 Tune in the desired station by rotating the TUNING control while watching the SIGNAL and TUNING meters.

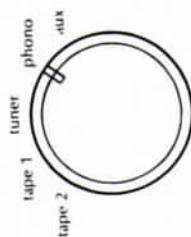
- 4 Now set the desired volume with the ATTENUATOR.

- 5 If hiss noise disturbs FM stereo reception, depress the MUTING/MODE switch to the OFF/MONO (■) position. Monaural reception is less subject to this noise.

2. PLAYING DISCS

- 1 Rotate the SELECTOR switch to the PHONO position.

PROGRAM SELECTOR



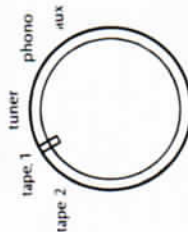
- 2 Operate the turntable unit.
- 3 Now set the desired volume with the ATTENUATOR.

3. TAPE-DECK RECORDING AND PLAYBACK

- **PLAYBACK**

- 1 Rotate the PROGRAM SELECTOR switch to the TAPE 1 (or TAPE 2) position.

PROGRAM SELECTOR

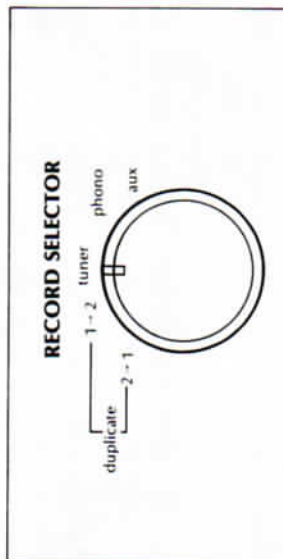


- 2 Operate the tape deck in the playback mode.
- 3 Now set the desired volume with the ATTENUATOR.

- 4 If the tape deck is fitted with an output level control, adjust this so that your ATTENUATOR setting gives you approximately the same volume as it would when listening to the TUNER section.

• RECORDING

- 1 Rotate the RECORD SELECTOR switch to the program source you wish to record.



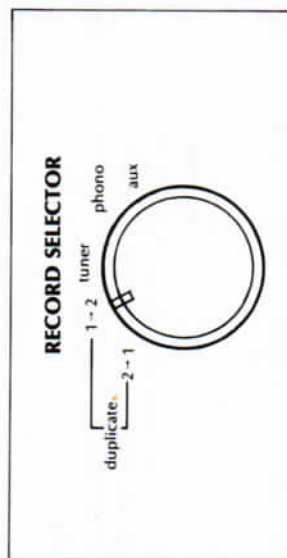
- 2 Operate the tape deck in the recording mode.
 3 Play the source to be recorded.
 4 If you rotate the PROGRAM SELECTOR switch to the same program source, you will be able to hear the program you are recording. You can, of course, listen to any other program source while the recording is in progress.
 5 If your tape deck is of the three-head kind (with separate record, playback and erase heads), you will be able to monitor the recording while it is being made. Rotate the PROGRAM SELECTOR to TAPE 1 (or TAPE 2—whichever you are using).

- 6 Adjust the recording level with the input level controls on the tape deck.

NOTE: The ATTENUATOR, tone controls, filters, etc., have no effect on the recording.

• DUPLICATING

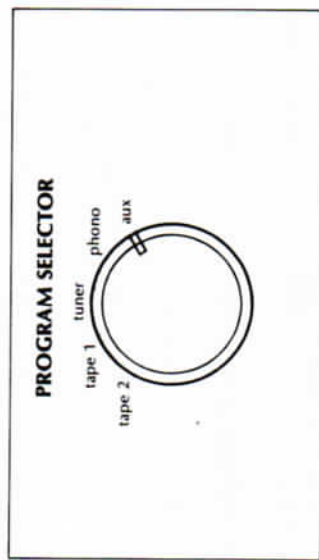
- Duplicating is simply playing back a tape on one tape deck and recording it on another.
 1 Rotate the SELECTOR switch to DUPLICATE: 1 → 2 (or 2 → 1).



- 2 Operate one tape deck, connected to the PLAY 1 (or PLAY 2) inputs, in the playback mode, and the other, connected to the REC 2 (or REC 1) outputs, in the recording mode.
 3 Other instructions are exactly the same as for recording and playback (as detailed).

4. PLAYING FROM OTHER SOURCES

- 1 Rotate the PROGRAM SELECTOR switch to the AUX position.



- 2 Operate the unit (8-track tape cartridge player, etc).
 3 Now set the desired volume with the ATTENUATOR or LOUDNESS control.

5. LISTENING WITH HEADPHONES

- 1 Plug the headphones into the PHONE output.
 2 Now set the desired volume with the ATTENUATOR or LOUDNESS control.
 3 The speakers will not be automatically muted: if you do not want to use them, switch them off with the SPEAKERS (A, B) switches.
 4 Low impedance (8~16 ohms) headphones are best. Higher impedance headphones may require rather higher settings of the ATTENUATOR control. Be sure to turn the volume down again before switching back to your speakers.

SPECIFICATIONS

Note: All measurements are for 8 ohms output unless otherwise stated.

AMPLIFIER SECTION

30watts per channel, min. RMS, at 8 ohms from 20Hz to 20kHz with no more than 0.02% total harmonic distortion.

33watts per channel, min. RMS, into 8 ohms at 1kHz with 0.02% total harmonic distortion.
40watts per channel, min. RMS into 4 ohms at 1kHz with 0.02% total harmonic distortion.

Dynamic headroom	1.0dB
Power bandwidth (0.1% T.H.D.)	+0, -3dB, 10Hz - 50kHz
Damping factor	40
Input sensitivity/impedance PHONO MM AUX, PLAY	2.5mV/47k ohms 150mV/33k ohms
Maximum input level PHONO MM	140mV
Output level/impedance REC OUT 1, 2	150mV/220 ohms
Frequency response PHONO MM AUX, PLAY	±0.3dB, 20Hz - 20kHz, RIAA ±0.5dB, 20Hz - 20kHz

Total harmonic distortion PHONO MM (ATT -20dB, 15W output) (1V output, 20Hz - 20kHz) AUX, PLAY (half power)	0.01% 0.02% 0.01% (15W)
Intermodulation distortion AUX, PLAY (rated power) (half power)	0.02% 0.01%
Signal to noise ratio (IHF A-weighted) PHONO MM (new IHF) PHONO MM (rated) AUX, PLAY (new IHF) AUX, PLAY (new IHF)	94dB 78dB 106dB 87dB
Residual noise (IHF A-weighted)	0.1mV

Tone control BASS TREBLE boost/cut boost/cut	±10dB at 100Hz ±10dB at 10kHz ±10dB at 100Hz, +8dB at 10kHz
Loudness control (attenuated -30dB)	

FM SECTION

Tuning range	87.5~108MHz
Usable sensitivity	10.3dBf (1.8μV)
50dB quieting sensitivity	16.0dBf (3.5μV)
MONO	37.8dBf (38.8μV)
STEREO	50dB
Image response ratio	90dB
IF response ratio	80dB
Spurious response ratio	55dB
AM suppression ratio	1.5dB
Capture ratio	65dB
Alternate channel selectivity	
Signal to noise ratio	82dB
MONO (55dBf)	76dB
STEREO (80dBf)	
Total harmonic distortion	0.08%
MONO	0.2%
STEREO	55dB
Subcarrier product ratio	
Stereo separation	45dB
1kHz	40dB
10kHz	
Frequency response	±0.5dB
50Hz to 15kHz	+0.5, -1.0dB
30Hz to 16kHz	

AM SECTION

Tuning range	525~1,605kHz
Usable sensitivity	300μV/m
Selectivity	30dB
Signal to noise ratio	52dB
Image response ratio	47dB
IF response ratio	35dB
Total harmonic distortion	0.5%

GENERAL

Power consumption (UL nominal)	120W
Dimensions (W x H x D)	470 x 169 x 410mm (18 1/2 x 6 5/8 x 16 1/8")
Weight	10.0kg (22.2 lbs)

Design and specifications are subject to change without notice for improvement.

BEFORE TAKING YOUR RECEIVER IN FOR SERVICING...

First check to ensure that all other components are properly connected to this unit and are operating normally. Then check the following items.

SYMPTOM	CAUSE	REMEDY
Power does not come on although the POWER switch is in the ON position.	Power cord not properly plugged in.	Plug in firmly.
	Fuse has blown.	Consult your authorized service center.
No sound.	Plugs and/or speaker connections are defective.	Check and replace or repair.
	PROGRAM SELECTOR or SPEAKERS switches in wrong positions.	Place in correct positions.
	Protection circuit in operation.	Ensure that speaker impedance is above 4 ohms and speaker leads (+/-) not touching.
Poor bass response and stereo effect.	Speaker(+/-) connections reversed.	Ensure that the (+) terminal of the speaker is connected to the (+) connector of the receiver and that the (-) speaker terminal is connected to the (-) connector of the receiver for both speakers.
Left and right channels out of balance.	Speaker or input connections faulty.	Check and replace or repair.
	BALANCE control needs adjustment.	Adjust.
Loud humming noise when listening to PHONO discs.	Loose PHONO connections or faulty ground connection.	Check and correct.
Loud howling noise when you turn up the volume listening to PHONO discs.	Due to acoustic feedback from the speakers to the turntable pickup.	Increase the distance between the speakers and the turntable unit. Insulating feet or pads under the turntable can help.
Your tape deck doesn't record the program you are listening to.	The RECORD SELECTOR is not at the position for the required program.	Turn to the proper position.
Poor sound quality at high volumes.	Overloaded speakers.	Turn down the ATTENUATOR control.

SYMPTOM	CAUSE	REMEDY
AM broadcasts accompanied by hum.	Poor reception area.	Difficult to cure: try moving the unit to a different position.
	Interference from domestic or other electrical equipment	Move the unit as far as possible away from the offending equipment, or fit interference suppressors.
Intermittent or continuous crackling on AM.	Electrical storms, atmospheric electricity, other interference.	A good external antenna and ground connection can improve reception.
High-frequency whistles (particularly at night) on AM.	Signals from other stations or from nearby TV set.	The 8kHz HIGH filter can reduce this noise. Move away from TV set.
Amateur (CB) radio conversation can be heard.	This is interference from improperly operated equipment.	Try to identify the operators and urge elimination of the interference.
The desired FM station cannot be heard at the correct frequency on the dial.	The muting circuit is preventing audition of a weak station	Switch the MUTING/MODE to OFF/MONO.
The STEREO indicator does not light for stereo FM programs.	The signal is too weak for stereo reception.	Install an outdoor FM antenna, or if you have one, increase the number of elements.
	The MUTING/MODE switch is in the OFF/MONO position.	Switch back to ON/AUTO.
Loud hissing between FM stations.	This is normally suppressed by the MUTING/MODE switch.	Switch to the ON/AUTO position.
Unacceptable amount of hiss on FM stereo stations.	Stereo broadcasts are more liable to this form of interference.	Use an outdoor antenna, or a more sensitive one, or orient it towards the desired station.
Local FM stations are distorted.	Signal too strong.	Turn the antenna away from the station, or fit an attenuator.

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